Energy Intensity: State Variations and National Implications

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RAND

Overview of Briefing

Why disaggregate by state

Understanding state-level variations

National Implications

Conclusions

Why Disaggregate by State

There is significant variation between states

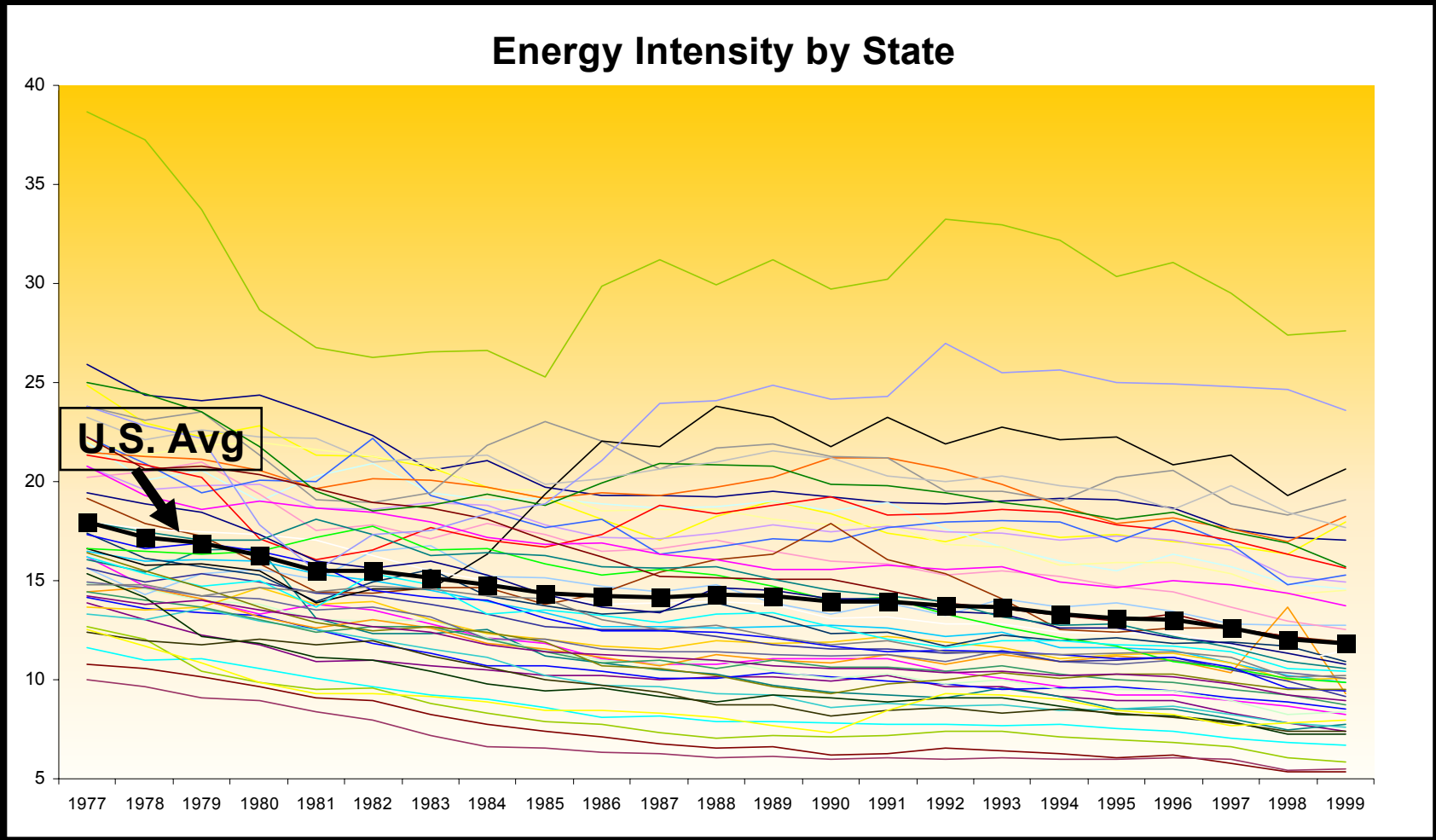
Some states have consistently reduced energy intensity

There is enough information to discern impacts and understand some of the variation

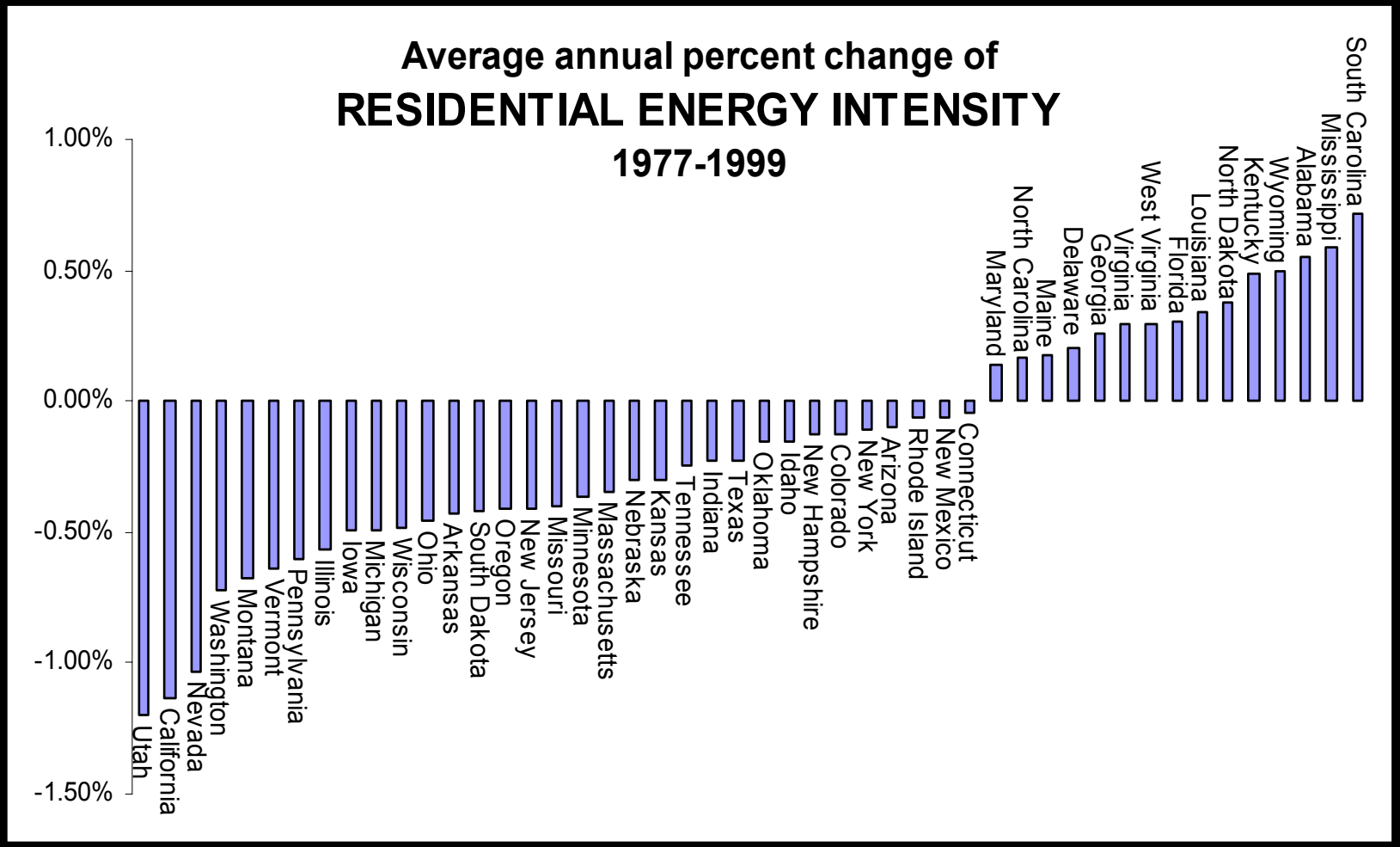
Important to understand if actions states have taken that have achieved intensity reductions are replicable

Can help shape national goals

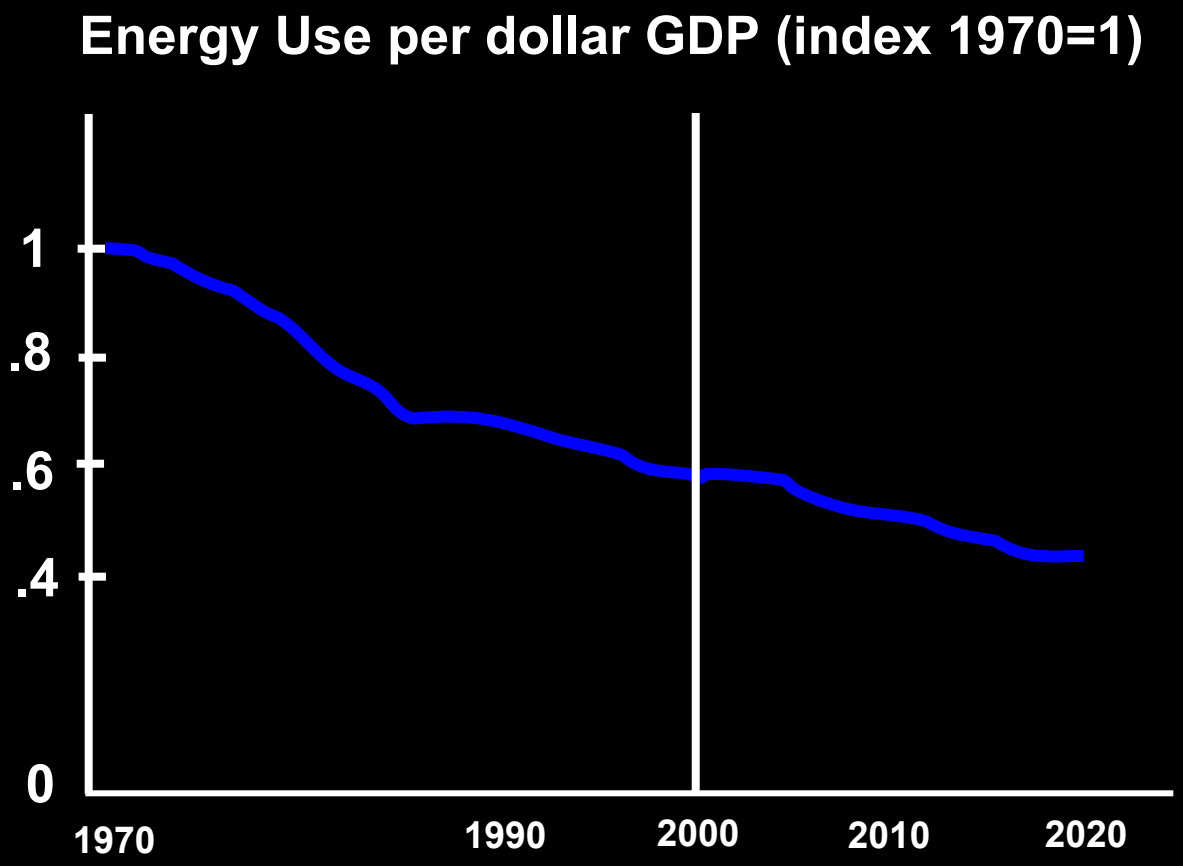
There is Significant Variation Between States



At the Sectoral Level, Some States Have Reduced Intensity, Some Have Increased



We Generally Forecast an Average Decline – But What if Every State Managed What Some States Have Done?



Source: EIA Annual Energy Outlook 2002

Understanding Why Changes in Energy Intensity Vary by State

We look at annual percent change in energy intensity

The variation between states may be due to:

- **Fixed-time and -state effects**
- **Variation in factors that impact energy use**
- **State-level actions or resources expended to support energy efficiency**

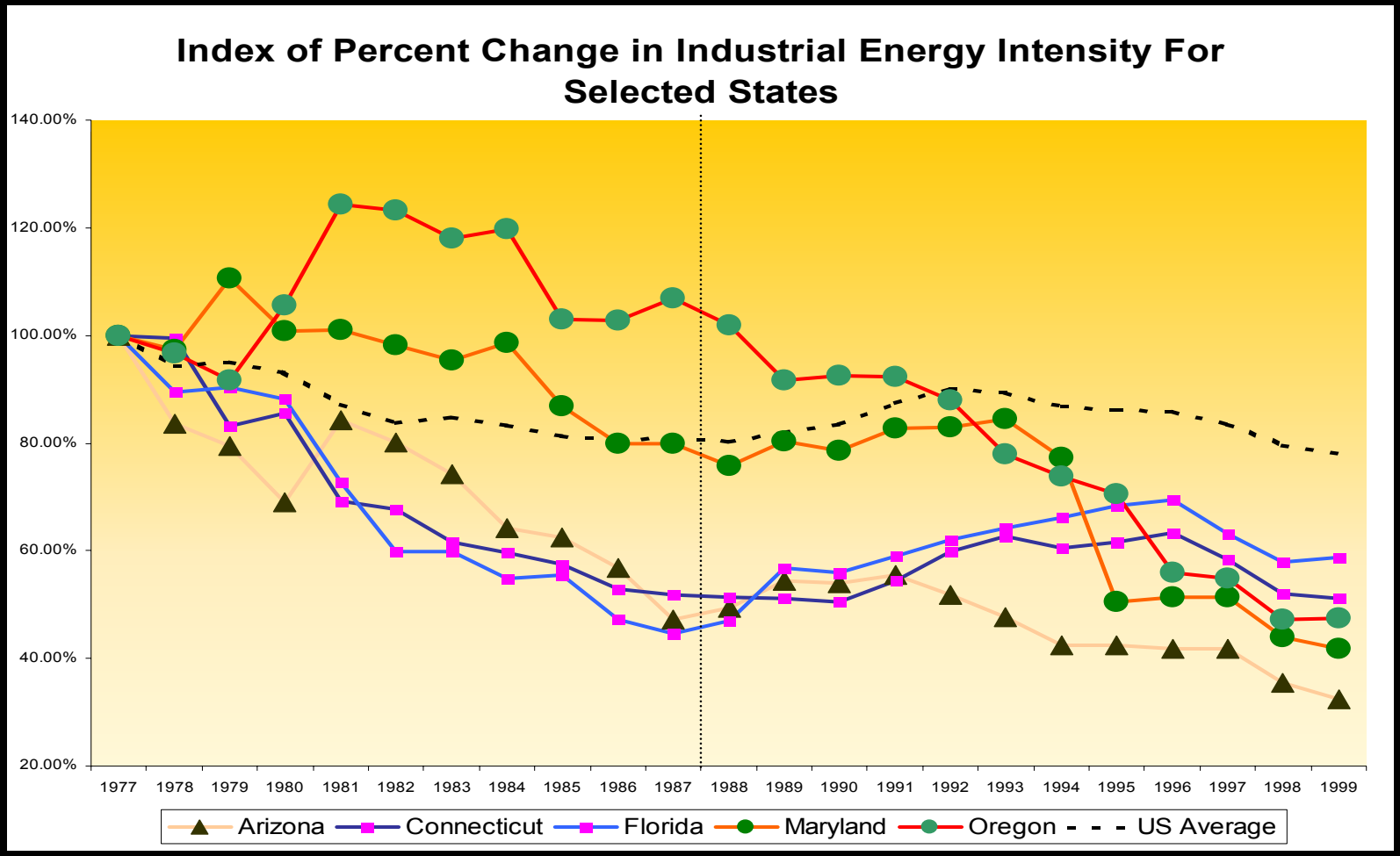
Is it possible to figure out how much might have been influenced by state-level actions?

Assessing the Impacts of Factors That Affect Energy Use

Try to account for factors that might impact energy use, then look at what's left over (residuals) – some of that might be due to state actions

Industry energy use/GSPi	Commercial energy use/GSPc	Residential energy use/capita
Climate	Climate	Climate
Prices	Prices	Prices
Industrial Mix	Floor space	Income
New Capital	Employment	Employment
Capacity Utilization	Services Mix	Household size

It Matters When You Start the Calculation, For This Analysis: 1988-1999



Comparing Total State Energy Intensities
1988-1999

Average Annual EI Change for all States = -1.6 % per year

States with Largest EI Reductions > 2.5%/yr

OR
WA
NC
CO
DE

States w/ Largest Reductions in Residuals >.7%/yr

OR
WA
NC
KS
AZ

States Who Bucked the Trend

FL
MI

States that show up in the top 10 in reductions and residuals

OR	KS
WA	AZ
NC	TN

Comparing Residential Energy Intensities

1988-1999

Average Annual EI Change for all States = -.05% per year

States with Largest EI Reductions > .5%/yr

CA
NV
NH
WA

States w/ Largest Reductions in Residuals >.5%/yr

MA
WY
VA
SC
NC

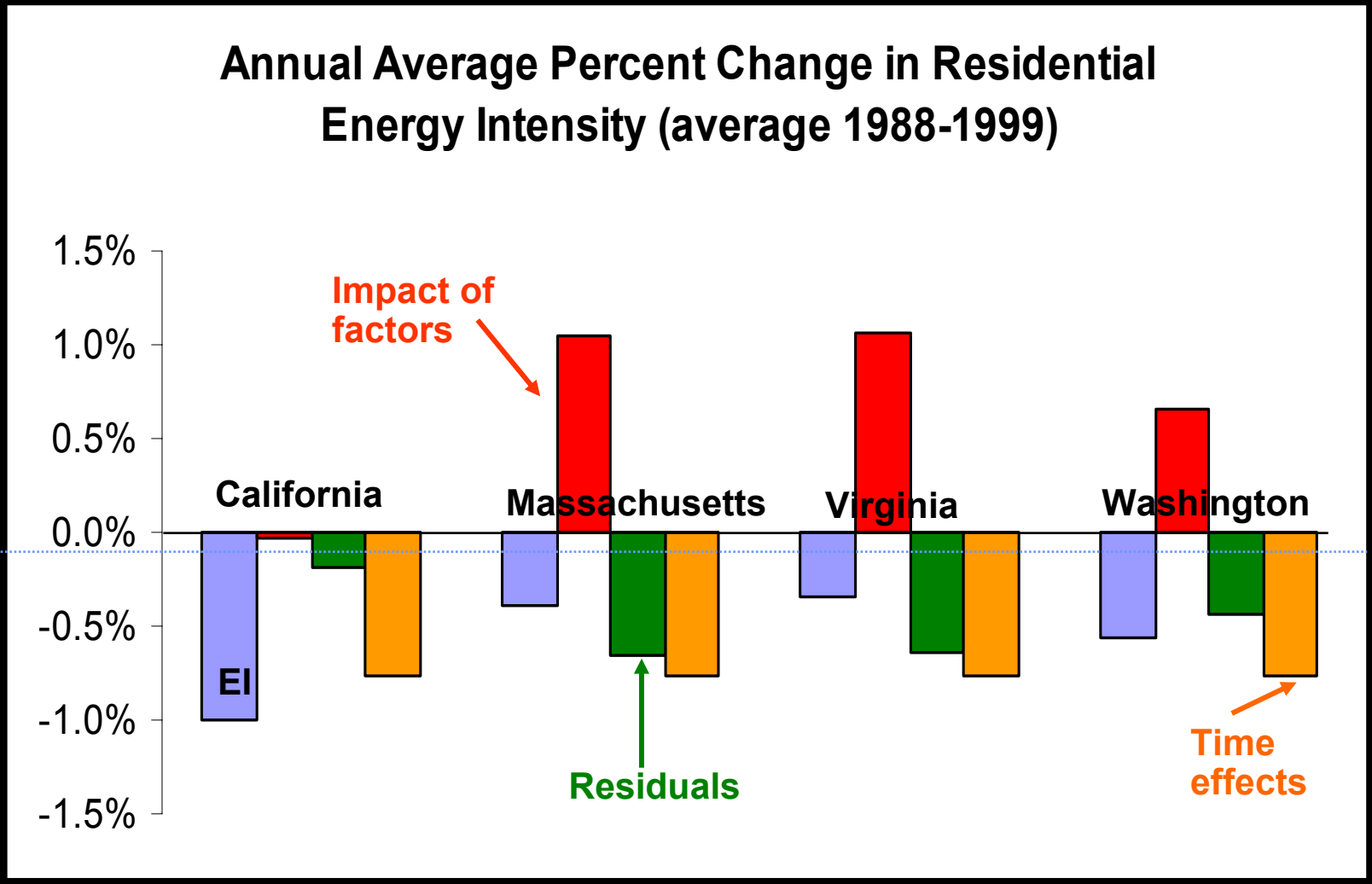
States with EI Increases But Who Bucked the Trend

AL
KY

States that show up in the top 10 in reductions and residuals

MA VA
NC WA

A Look At Some States



Comparing Commercial Energy Intensities
1988-1999

Average Annual EI Change for all States = -1.9% per year

States with Largest EI Reductions > 3%/yr

WA CO
MT NE
MA NV
TX

States w/ Largest Reductions in Residuals >1%/yr

WA CO
MT NE
CA

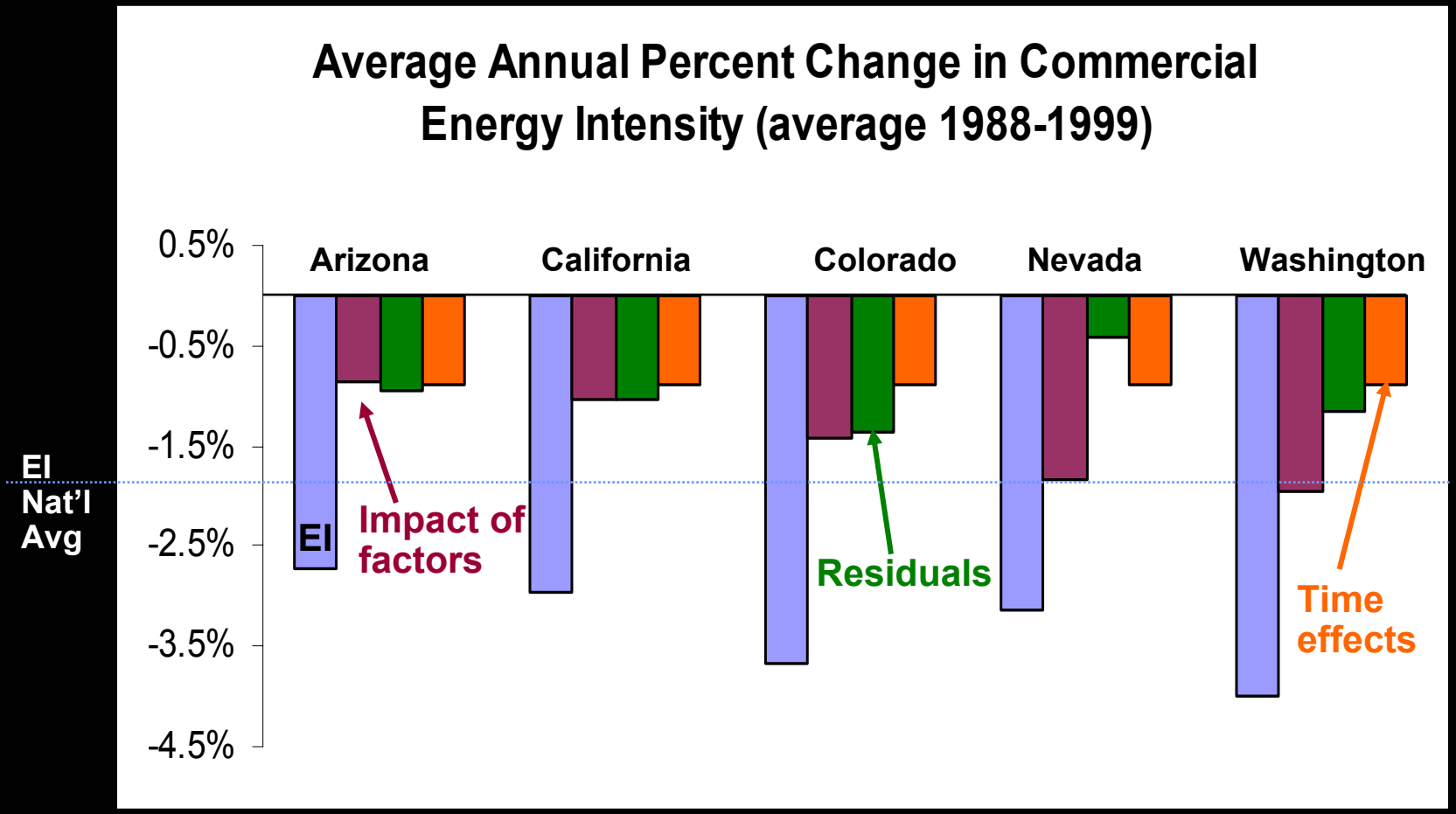
States with EI Increases But Who Bucked the Trend

None

States that show up in the top 10 in reductions and residuals

WA CO
MT NE
CA OR

A Look At Some States



Comparing Industrial Energy Intensities
1988-1999

Average Annual EI Change for all States = +.23% per year

States with Largest EI Reductions > 2%/yr

OR	MD
SD	TN
NM	AZ
ID	PA

States w/ Largest Reductions in Residuals >2%/yr

OR	MD
SD	TN

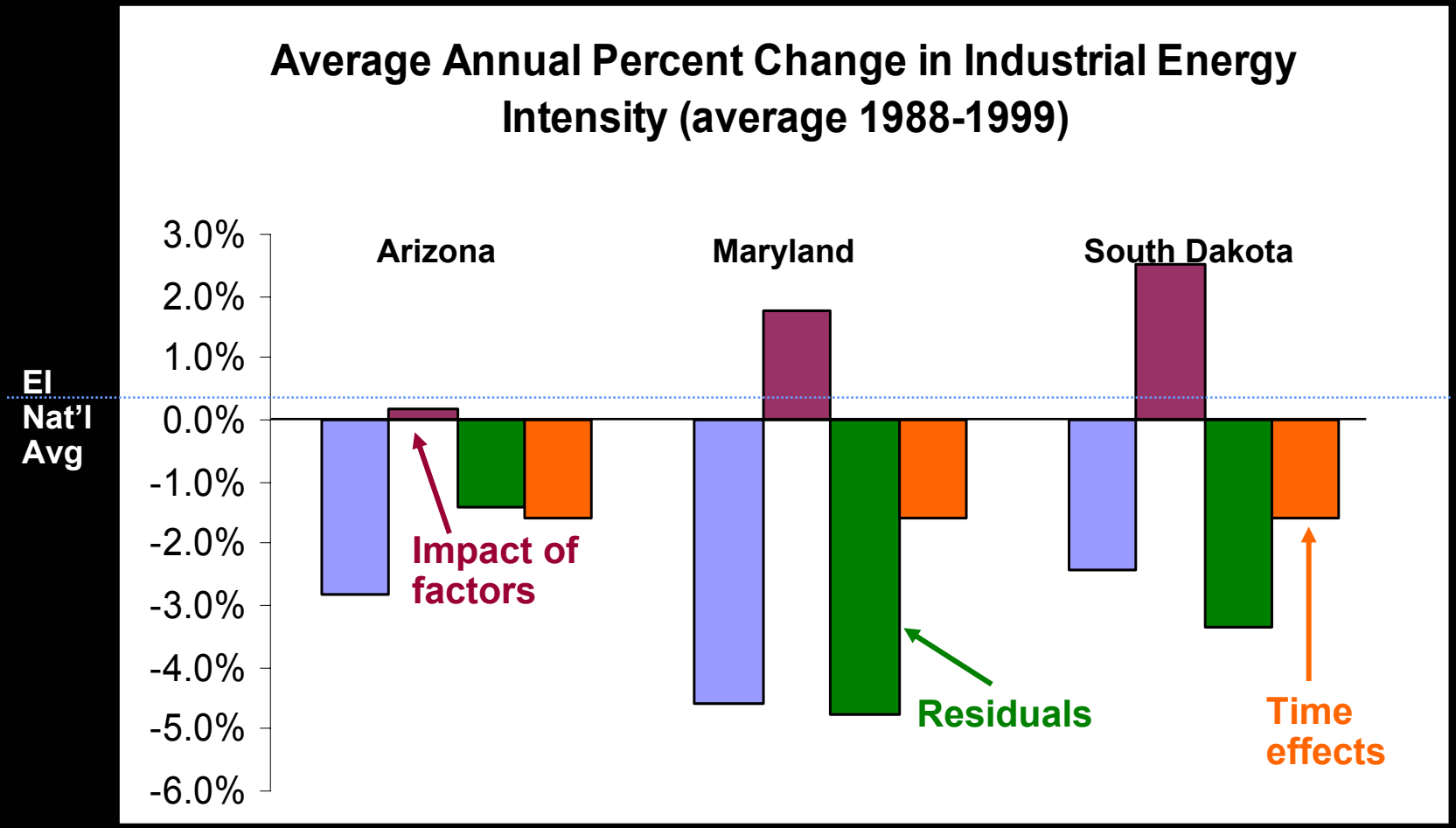
States with EI Increases But Who Bucked the Trend

AL
ND

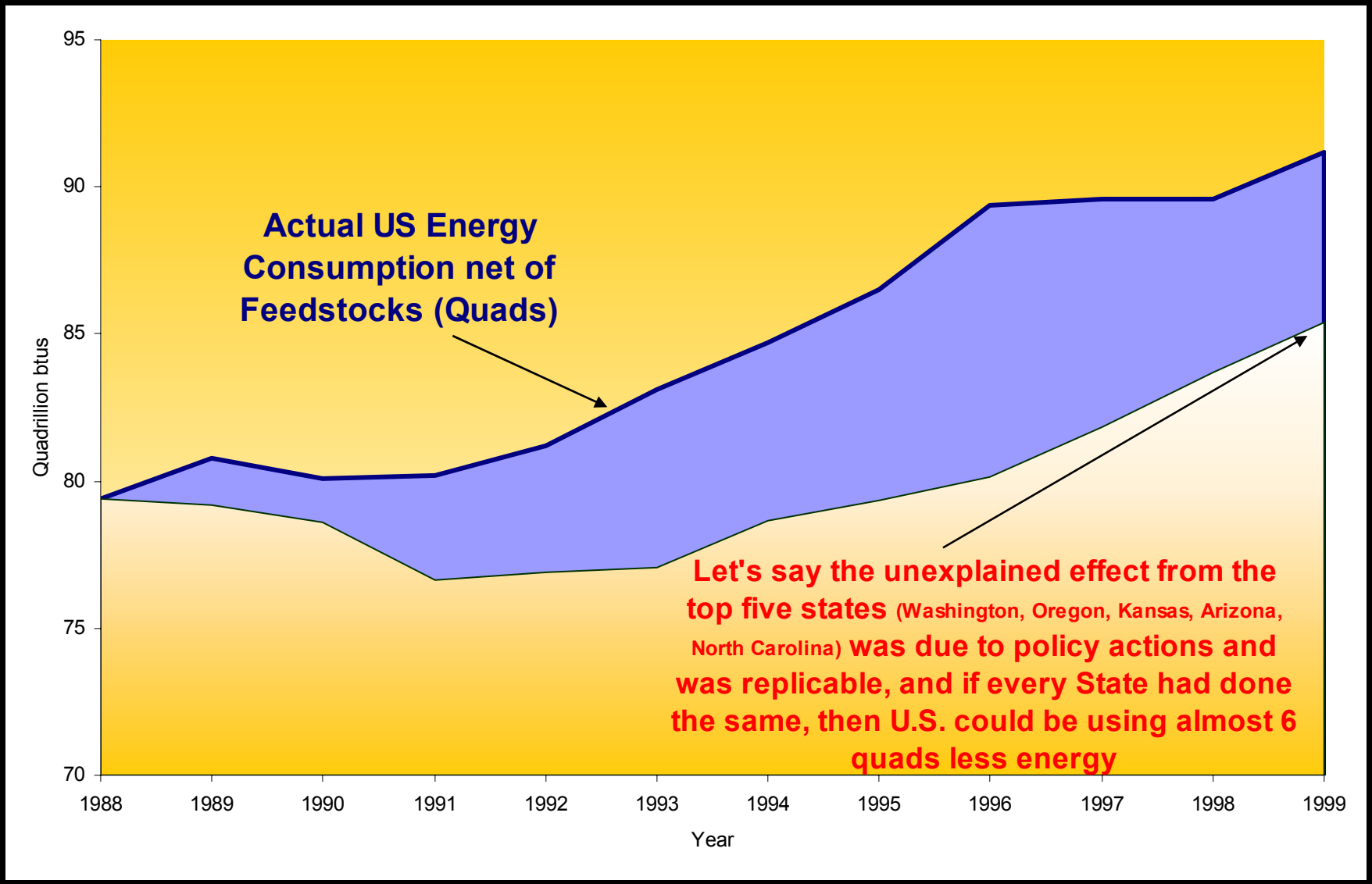
States that show up in the top 10 in reductions and residuals

OR	MD
SD	TN
NM	AZ
PA	

A Look At Some States



A Thought Experiment

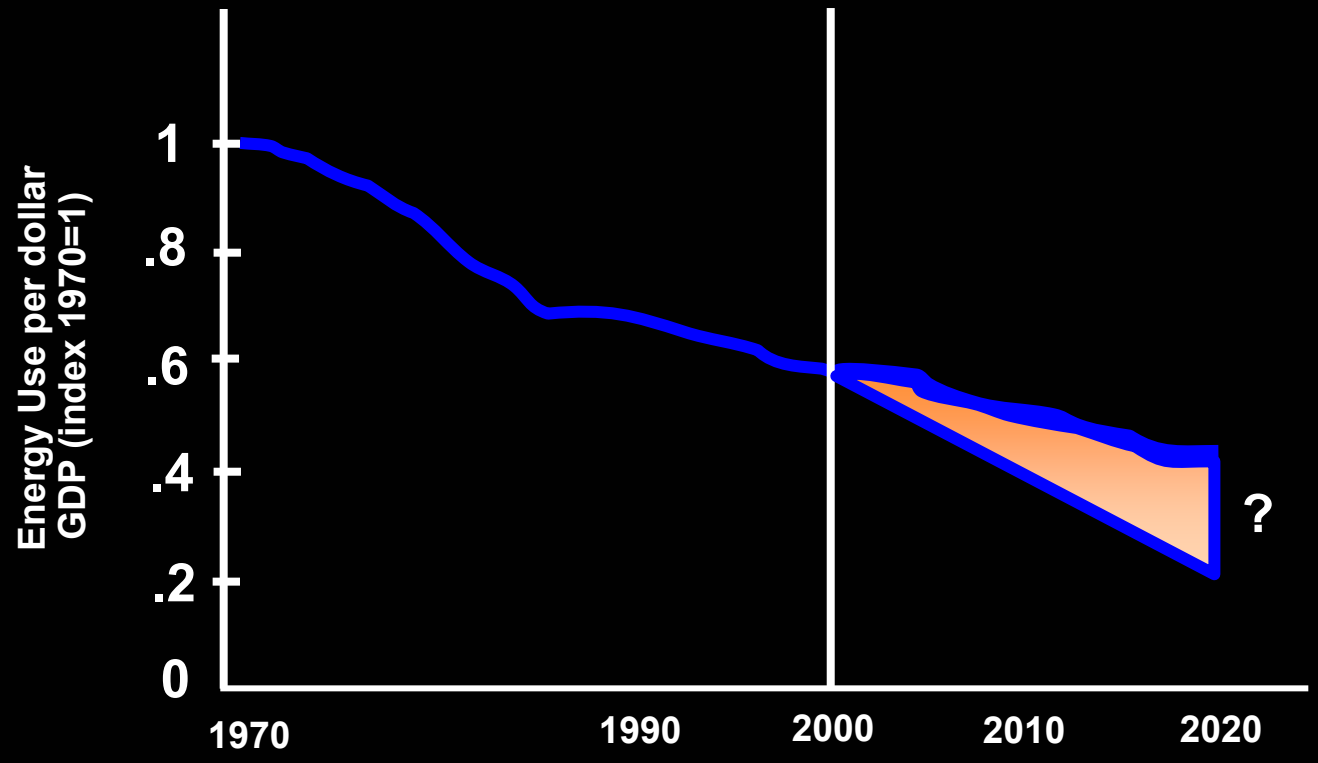


What's Next

Look closely at state actions

Describe elements of replicable policies

'Estimate' future intensity potential for US



DOE's E-VISION 2002

May 15, 2002

"State and Local Government Experiences With Reducing Energy Intensity"

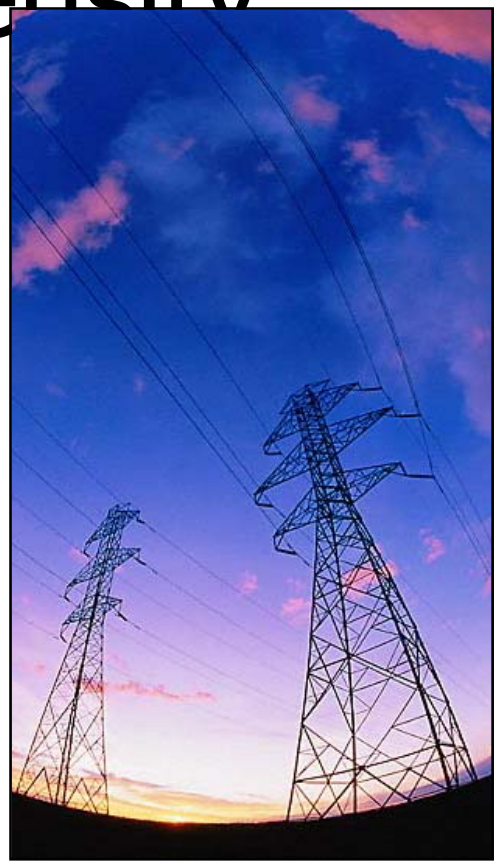
Brian M. Henderson

Director, Energy Efficiency Services

NYSERDA

State Experiences With Reducing Energy Intensity

- Administrator
  - Design and Implement System Benefits Charge Programs
- Regulator
  - State Energy Code
  - Green Building Tax Credit
  - State Purchasing Standards
- Facilitator
  - State EnVest/ESCO's
  - $125 Million tax exempt leasing
- Policy Maker
  - Executive Order
  - Lower Manhattan Redevelopment



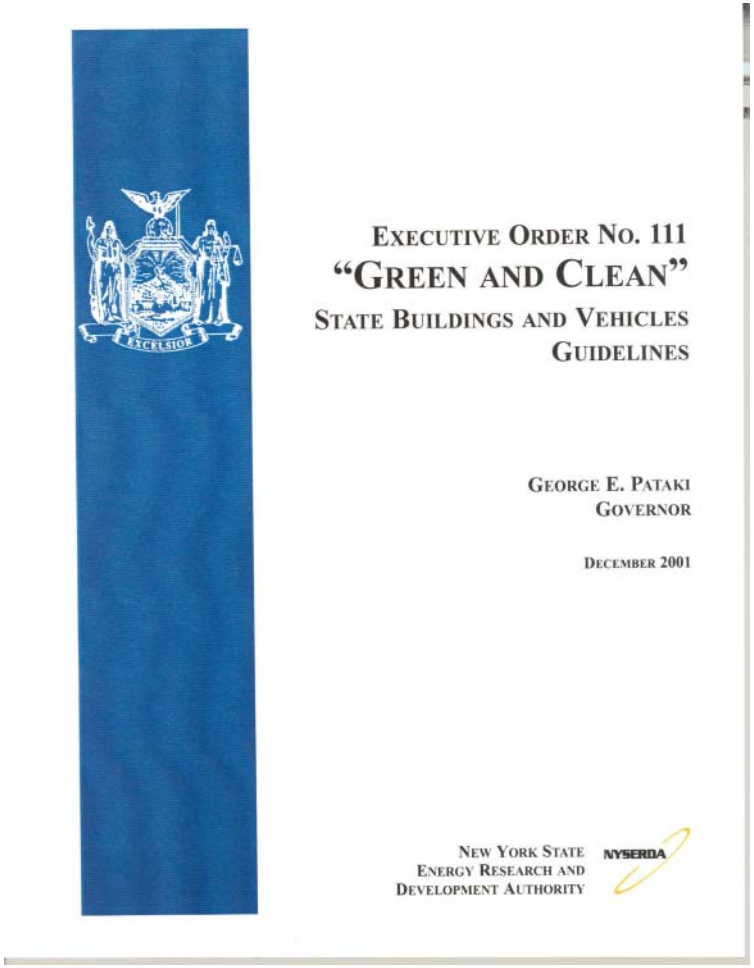
State Experiences with Reducing Energy Intensity

- Administrator of SBC Program
  - Initial 3-year Outcomes
    - $201M in funds committed
    - 35 programs leveraging $617M
  - New Construction
    - Transforming the way buildings are designed and built
  - Existing Buildings – C/I Performance Program
    - +1500 Building retro-fits with ESCO's
    - 36 School districts
    - Local Government buildings; WWTP; Traffic lights

Policy Maker

- "Green and Clean" State Buildings and Vehicles

- Executive Order #111 Requirements
  - 35% Reduction in energy consumption by 2010
  - New Construction: "Green Buildings"
  - Existing Buildings: Energy Star®
  - Peak Demand Reduction targets



Policy Maker

- "Green and Clean….." – Continued
  - 20% of Power from Renewables by 2010
  - 100% Alternative-Fueled Vehicles
  - 17 Agency Advisory Council chaired by NYSERDA
  - Mandatory on State: Voluntary Local Government/Schools

Policy Maker

- Lower Manhattan Redevelopment
  - NYSERDA President on the LMRC Board
  - Target and Enhance SBC Programs
  - Green Building Guidelines

Outcomes

- Establish demand for energy efficient technologies
- Facilitate competition in private sector
- Develop infrastructure and transform markets
- Fill "gaps" in public need
- Aggregate underserved markets
- Overcome long-standing barriers
- Better environmental quality, health, and economic benefits
- Increase energy affordability and comfort
- Leverage private and federal $

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www.nyserda.org

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www.GetEnergySmart.org

Public Technology, Inc. and the Urban Consortium Energy Task Force

E-VISION CONFERENCE

MAY 15, 2002

SHARRON BROWN

DIRECTOR OF ENERGY PROGRAMS

Introducing PTI and UCETF

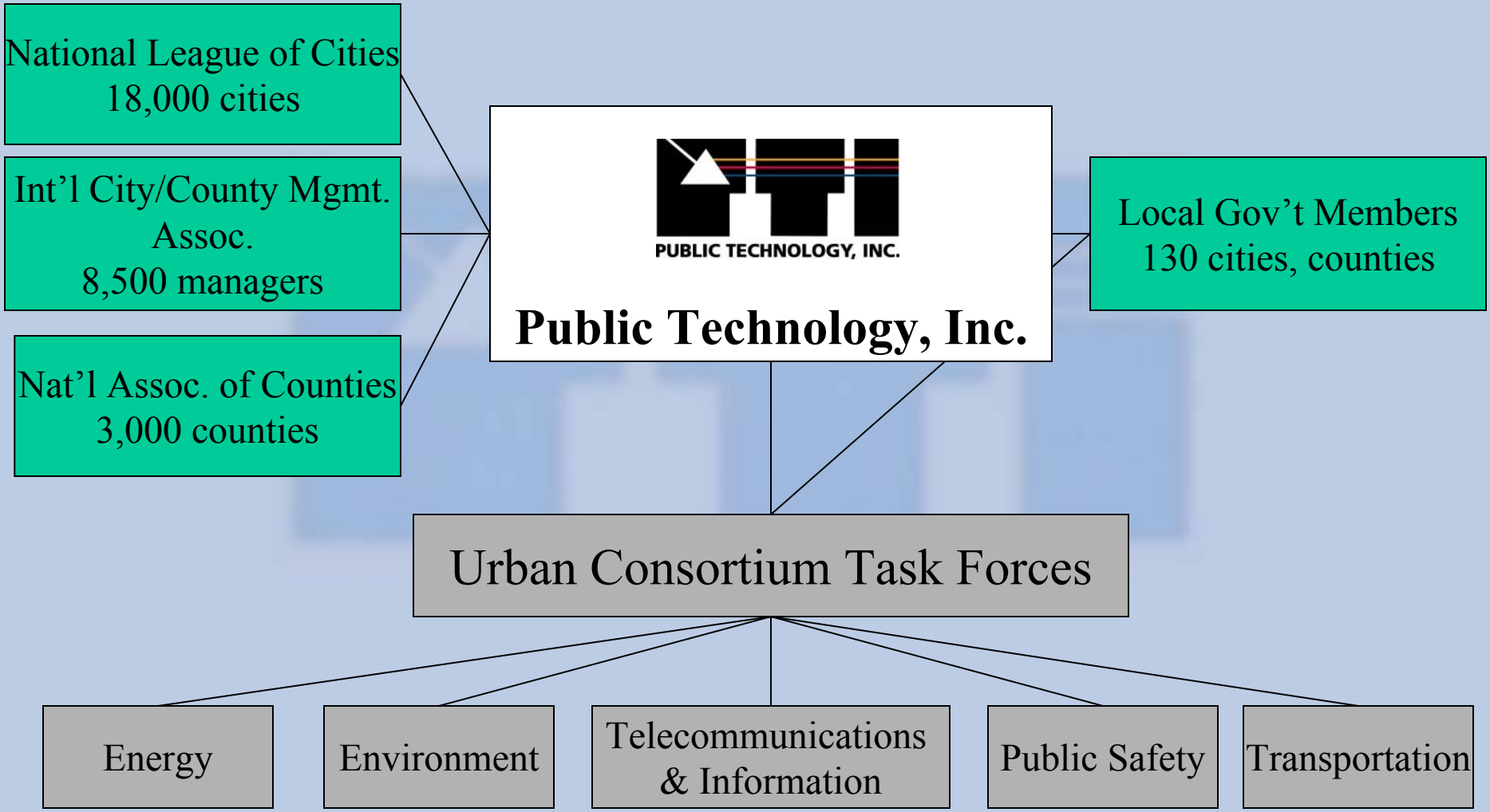
- **PTI**: A nonprofit organization that advances the development and use of technology by local governments. Rebuild America Strategic Partner.
- **Urban Consortium**: A network largely of America's largest cities and counties, working together to research and solve problems facing all local governments. The only such permanent network totally focused on technology.
- **Urban Consortium Energy Task Force**: Addressing the critical energy management and efficiency needs of local governments.

PTI
PUBLIC TECHNOLOGY, INC.

Dept. of Energy
Rebuild America

Urban Consortium
Energy Task Force

How We Work


National League of Cities
18,000 cities
Int'l City/County Mgmt. Assoc.
8,500 managers
Nat'l Assoc. of Counties
3,000 counties
PUBLIC TECHNOLOGY, INC.
Public Technology, Inc.
Local Gov't Members
130 cities, counties
Urban Consortium Task Forces
Energy
Environment
Telecommunications & Information
Public Safety
Transportation

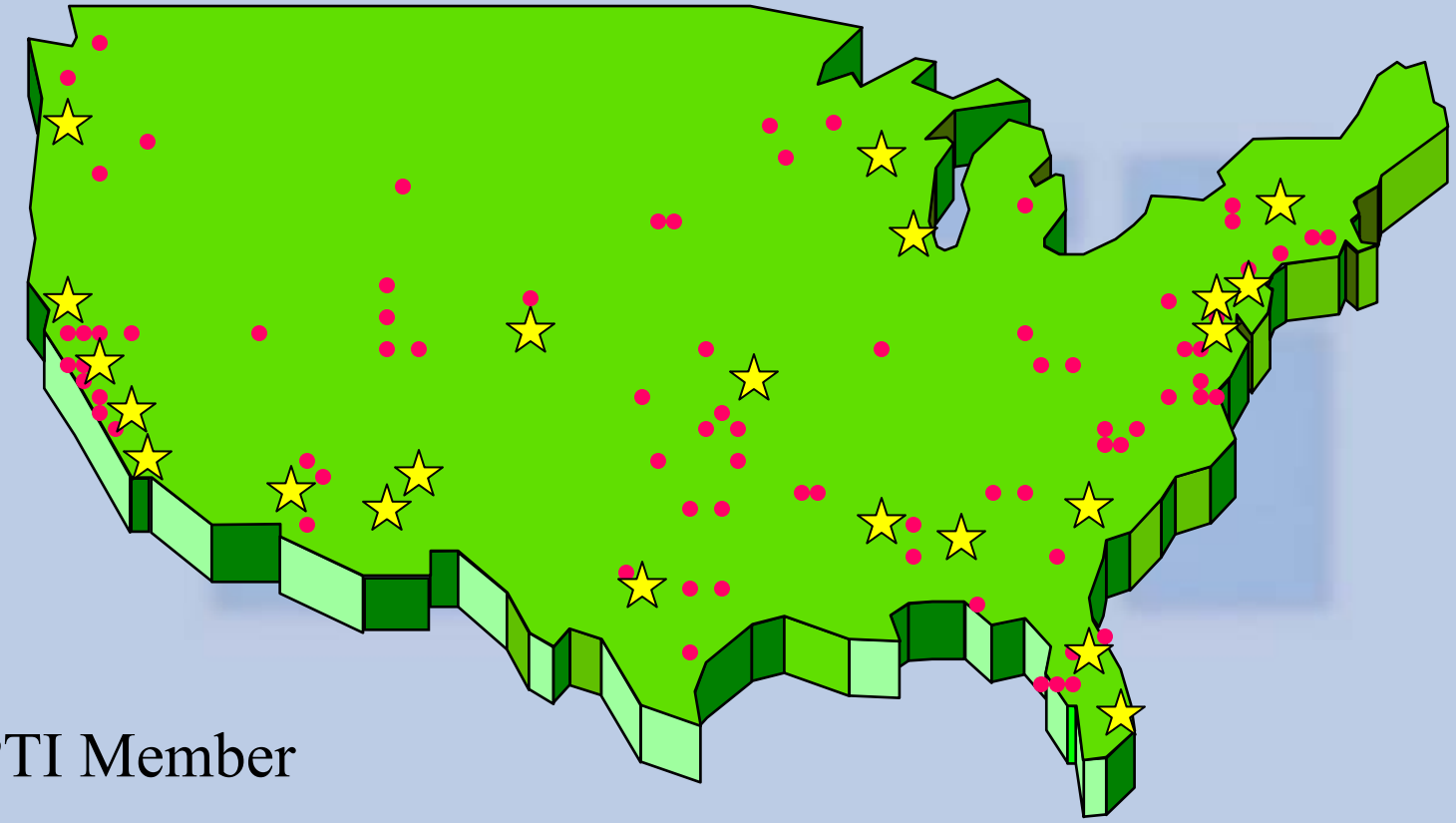
What We Do

UCETF seeks to identify and develop innovative ways to:

- improve energy efficiency,
- reduce local government expenditures, and
- maximize opportunities for local economic growth

through energy management programs, projects and policy tools.

UCETF Members



- PTI Member
- UCETF Member

Local Projects, National Results

We look at the big picture – How can you cut your energy bill? Can alternative fuels reduce air pollution? What can cure "sick" buildings? Some examples:

- **The Rhode Island League of Towns** established an electricity aggregation program for its members
- **Phoenix, AZ**, studied alternative methods of handling sludge and gas in wastewater treatment plants
- **Honolulu, HI**, gathered 12 months of operational data on advanced electric vehicles in its municipal fleet
- **Hennepin County, MN**, developed criteria for establishing telework centers

BACKGROUND & SUCCESS FACTORS

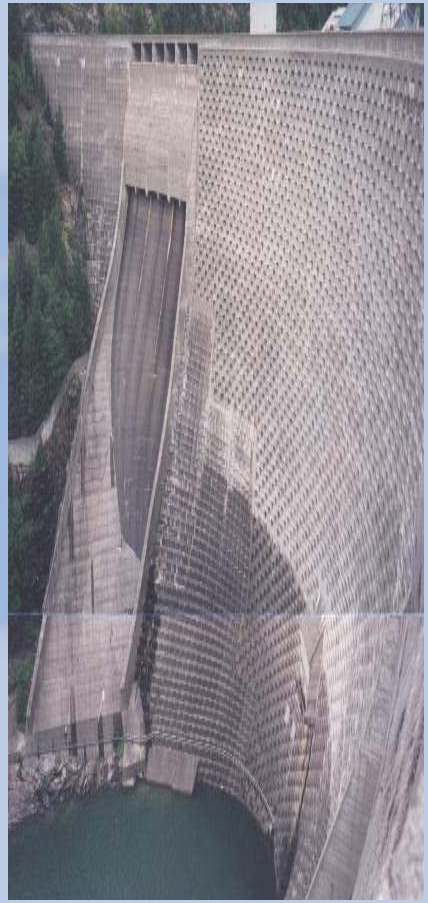
- **Implemented in 1977; operated by municipal electric utility**
- **Energy savings are part of the City's energy resource portfolio**
- **Supportive elected officials; supportive community**
- **Service delivery w/ field staff & trade allies**
- **All sectors served: Residential, Commercial, Industrial Institutional, & Governmental**
- **Target market segments: Low Income, Single & Multifamily, Small Businesses, Commercial & Industrial retrofit, & new Construction**
- **Variety of services & programs**
- **Utilization of incentives**
- **Extensive collaboration & leveraging of resources**

STRATEGY GUIDELINES

IMMEDIATE:

↑ **ENERGY PRICES** & ↓ **WATER SUPPLY**

- **Reduce utility's electric load this year**
- **Offset impact of higher electricity rates**
- **Implement simple programs & services**
- **Conduct community workshops & outreach**
- **Broaden focus on low-income**
- **Provide support to small businesses**
- **Intensify focus on city's largest consumers**



STRATEGY GUIDELINES

LONG TERM

- Install permanent conservation measures
- Ensure long-term savings
- Target medium & large Commercial & Industrial users
- Capture lost opportunities
- Provide incentives
- Enhance current program & service offerings; fill in service gaps
- Increase commitment to low income
- Double savings acquisition (6 aMW to 12 aMW)
- Increase budget by 1/3 ($18m - $25m)
- Increase stringency of local energy codes & connection standards
- Reduce greenhouse gas emissions

RESULTS

For 2002

- **Energy Savings - approx. 6.5 aMW**
  - Enough energy to power about 5,300 Seattle homes for one year.
  - Energy Savings in 2000 are worth approx. $11 million in avoided power purchases
- **CO_2 Reductions**
  - Reduced greenhouse gas emissions by 23,500 short tons equal to more than 4,700 vehicles off the road for one year.

YTD 2001

- **Energy Savings**
  - Reduced system load by approx. 18 MWs w/ voluntary curtailment
- **CO_2 Reductions**
  - 68K short tons = approx. 25K autos off road/yr

CAPE LIGHT COMPACT
Energy Efficiency Saves $$

- Plan Ensures Revenues Generated from Local Ratepayers are Spent Locally.
- $4.7 Million in Energy Services Over the Next 18 Months.
- Four Main Programs for Energy Services.
- Pilot Peak Shaving Program for Small Consumers.

CAPE LIGHT COMPACT
Consumer Protection Saves $$

- Improvement of Reliability of Power.
- Asset Divestiture Intervention Saved $25 Million in Stranded Costs.
- Streetlight Purchase Program, $400,000 in Annual Savings for Towns.

CAPE LIGHT COMPACT
Power Supply Saves $$

- Regional Procurement of Natural Gas and Fuel Oil, $165,000 and $500,000 in Annual Savings.

- Two-Year Municipal Power Supply Contract, $750,000 in Savings.

CAPE LIGHT COMPACT
Power Supply Saves $$

- *Community Choice* Power Supply Program on Target to Deliver Savings to all Consumers.

- Developed a Distributed Generation and Renewable Energy Program.

BEST Services (cont.)

TRANSPORTATION ALTERNATIVES

- Efficient transportation alternatives

AWARDS/CASE STUDIES

- Recognition for “BEST Businesses”
- Case studies on BEST award winners

Portland, OR


BEST
BUSINESSES FOR AN
ENVIRONMENTALLY
SUSTAINABLE
TOMORROW

BEST Services

ENERGY EFFICIENCY

- Obtain free energy design assistance
- Apply for tax credits from the state
- Receive rebates from local utilities
- Select energy-efficient technologies
- Get long-term, fixed-rate financing

BEST Services (cont.)

WASTE REDUCTION

- Recycle construction waste
- Include recycled content building materials

WATER CONSERVATION

- Efficient water technologies

BEST Services (cont.)

TRANSPORTATION ALTERNATIVES

- Efficient transportation alternatives

AWARDS/CASE STUDIES

- Recognition for “BEST Businesses”
- Case studies on BEST award winners

BEST Annual Results

BEST Award Winners are Saving...

- $10.3 Million total cost avoidance
- 37.2 million kWh of electricity
- 6.6 million therms of natural gas
- 687,000 gallons of gasoline

BEST Annual Results

BEST Award Winners Savings (Cont.)

- 379 million gallons of water
- 60,900 tons of solid waste
- 9.4 million miles (VMT)
- 93,700 tons CO_2 emissions

Knowledge and Technology Transfer

We share what we learn from our projects:

- Project results and lessons learned are captured and distributed as reports, guidebooks, videos or workshop presentations – directly and through NLC, ICMA and NACo
- Online resources like Access Local Government and PTI's "Tell Me More" news service
- Peer-to-peer exchanges at events year-round and around the country

Get Involved With PTI

- **Contact Public Technology, Inc.**
  - **(800) 852-4934**
  - **www.pti.nw.dc.us**
  - **Contact: Sharron Brown, Director**
  - **(202) 626-2428**
  - **sbrown@pti.org**

PUBLIC TECHNOLOGY, INC.

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Energy Task Force